REMARKS

Claims 1-17 are pending in this application and were rejected. Applicants are amending claims 1, 5, 6, 10, and 16 to address the rejections and adding new claims 18-23. Applicants are amending the specification to correct typographical errors. In view of the foregoing amendments and following remarks, Applicants hereby respectfully request reconsideration of the Application. A marked-up version of the amended specification and claims is provided in the Appendix.

Rejection Under 35 U.S.C. §112

In paragraph 2 of the Office Action, the Examiner rejected claims 5 and 10 as being indefinite for failing to particularly point out and distinctly claim the subject matter. Applicants are amending claims 5 and 10 by replacing the phrase "the first and second capacitances" by the phrase "the first and second capacitive elements." Applicants submit that amended claims 5 and 10 have antecedent basis for "the first and second capacitive elements," and respectfully request that the rejection be withdrawn.

Rejection Under 35 U.S.C. §102

In paragraph 6 of the Office Action the Examiner rejected claim 1 as being anticipated by U.S. Patent No. 1,711,653 to *Quarles*. Applicants respectfully traverse. *Quarles* discloses a loading unit 5 (FIG. 1) comprising inductance coils 7 (FIG. 1) of equal inductance and two condensers 8 (FIG. 1) of equal capacity, the effective inductance of which is a variable quantity depending on the frequency of the transmitted waves (page 1, lines 66-70 and lines 96-100). *Quarles'* loading unit 5 is configured to address the problem of transient distortion (wave dispersion) of POTS signals over POTS lines. Transient distortion occurs when the different frequency components comprising a POTS signal travel over a POTS line at different wave

velocities (page 1, lines 22-26). *Quarles'* loading unit 5 proposes to solve the wave dispersion problem by designing a loading unit configured with an effective frequency-dependent inductance. *Quarles* states, page 1, lines 70-77,

> By virtue of its diminishing inductance at the higher frequencies the propagation velocity of the line falls off less rapidly with increasing frequency than it does in an ordinary loaded line, and by properly proportioning the loading unit the velocity may be substantially equalized throughout a wide frequency range.

In addition, *Quarles* states, page 4, lines 43-49,

> The attenuation of a line loaded in accordance with the invention is increased by the addition of the loading unit capacities, the increase ... being substantially proportional to the square root of the increased value of the total effective capacity.

The increased value of the total effective capacity is $(1 + r)^{1/2}$, where r is the ratio of the capacity of the loading unit to the line capacity (page 3, lines 25-29). In other words, *Quarles'* system is configured to address transient signal distortion at the expense of signal attenuation.

In contrast, the Applicants' invention is a load coil 130 (FIG. 3) coupled to a local loop 116 (FIG. 3) for improving transmission of POTS-band signals and higher frequency DSL signals across the local loop 116 (Summary, lines 2-6). Load coil 130 includes a coupled inductor 308 (FIG. 3) comprising inductor windings 302 and 304 (FIG. 3) wrapped about a inductor core 306 (FIG. 3). Coupled inductor 308 is coupled to the local loop 116 and configured to counteract a parallel (or distributed) capacitance of local loop 116 to improve transmission of POTS-band signals over local loop 116 (page 12, line 16 - page 13, line 2). Load coil 130 improves POTS-band signal transmission over local loop 116 by flattening the frequency response of local loop 116 to POTS-band signals (page 7, line 15-16). In addition, the load coil 130 includes capacitive elements, such as capacitors 320 and 322 (FIG. 3), that

increases the effective capacitance of the coupled inductor 308 to permit the DSL signals to traverse the load coil 130 with low attenuation (page 13, lines 7-10).

Applicants have amended claim 1 to better define the scope of the invention. Amended claim 1 recites,

> A load coil for insertion along a local loop, the load coil comprising: a coupled inductor ... **configured** to counteract a parallel capacitance of the local loop to improve transmission of POTS-band signals across the local loop; a first capacitive element ... and a second capacitive element ... the first capacitive element and the second capacitive element **configured** to permit passage of DSL signals across the load coil (emphasis added).

Applicants respectfully submit that Applicants' load coil 130 and *Quarles'* loading unit 5 are configured to address different signal transmission issues. Applicants' load coil 130 comprises a coupled inductor and capacitive elements **configured** for improving transmission of POTS-band signals across a local loop and to permit passage of (higher frequency) DSL signals across the load coil, respectively, as claimed. In contrast, *Quarles'* loading unit 5 comprises inductive and capacitive elements **configured** to simulate an effective frequency-dependent inductance for reducing dispersion of POTS-band signals across a line. In addition, *Quarles'* system is **not configured** to process higher frequency bandwidth signals, and more specifically, *Quarles'* system is **not configured** to permit passage of higher frequency bandwidth signals, such as DSL signals, as claimed.

Rejection under 35 U.S.C. §103

In paragraph 8 of the Office Action, the Examiner rejected claims 2, 3, and 5 under 35 USC 103(a) as being unpatentable over *Quarles* in view of *Federal Telephone and Radio Corporation*. Applicants respectfully traverse. With regard to claims 2 and 3, the Examiner states that "[i]t would have been obvious ... to utilize the published values for transmission line

capacitance to calculate the capacitances taught by Quarles for the purpose of implementing Quarles's invention" (paragraph 9, lines 12-15, and paragraph 10, lines 6-9). Applicants respectfully submit that combining the primary and secondary references do not overcome the deficiencies of the primary reference. Based on the above remarks directed to amended claim 1, Applicants submit that the combination of *Quarles* and *Federal Telephone and Radio Corporation* is not the present invention as claimed and respectfully request that claims 2-3 be allowed.

With regard to amended claim 5, the Examiner states that the combination of *Quarles* and *Federal Radio and Telephone Corporation* teach capacitance values between 17 nF and 34 nF (paragraph 11, lines 4-5). Furthermore the Examiner alleges, paragraph 11, lines 7-9, that "it is inherent in the values taught by Quarles and Federal Telephone and Radio Corporation that they increase the effective interwinding capacitance of the inductor windings by at least a factor of 5," since the "Applicant discloses that capacitances in the range of 5 nF to 50 nF increase the effective interwinding capacitance by a factor of five" (paragraph 11, lines 6-7). Applicants submit that neither the primary or secondary reference disclose or suggest that capacitance values in the range of 17 nF to 34 nF, or capacitance values in any range, increase the effective interwinding capacitance of the first and second windings of a load coil by at least a factor of five. In fact, neither reference even suggests a ratio of capacitive element capacitance to inductor winding interwinding capacitance. In addition, Applicants fail to see how a disclosure that capacitance values in the range of 5-50 nF are at least five times, and preferably at least 10 times, the interwinding capacitance of each of the inductor windings are significant in determining the obviousness of the combination. Applicants respectfully submit that the

Examiner may not use hindsight to reject claims based on obviousness. See MPEP, page 2100-152, section X, subsection A:

> Applicants may argue that the examiner's conclusion of obviousness is based on improper hindsight reasoning. However, "[a]ny judgement on obviousness is in a sense necessarily a reconstruction based on hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and **does not include knowledge gleaned only from applicant's disclosure**, such a reconstruction is proper." *In re McLaughlin* 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971).

Although the Applicants do not fully understand how the Examiner is using the Applicants' disclosure to justify the obviousness rejection, it appears as if the Examiner is using knowledge gleaned only from Applicants' disclosure, since the cited references individually or in combination do not teach any capacitive element capacitance to interwinding capacitance ratios.

Based on at least the above remarks, Applicants submit that amended claim 5 is not obvious over *Quarles* in view of *Federal Telephone and Radio Corporation* and respectfully request that amended claim 5 be allowed.

In paragraph 12 of the Office Action, the Examiner rejected claim 4 under 35 USC 103(a) as being unpatentable over *Quarles* in view of *Baker*. The Examiner states, paragraph 12, lines 5-6, "Baker discloses that 66 mH is one of the two most commonly used values for inductors used as loading coils...." In addition, the Examiner states, paragraph 12, lines 7-8, "[i]t would have been obvious ... to use a load coil with a common inductance value in the system disclosed by Quarles ...." Applicants respectfully traverse and submit that combining the primary and secondary references do not overcome the deficiencies of the primary reference. Based at least on the above remarks directed to amended claim 1, Applicants submit that the combination of *Quarles* and *Baker* is not the present invention as claimed and respectfully request that claim 4 be allowed.

In paragraph 13 of the Office Action the Examiner rejected claim 6 as being unpatentable over U.S. Patent No. 3,476,883 to *Birck* in view of well known prior art (MPEP 2144.03). Applicants respectfully traverse. *Birck's* system comprises a conductor pair including conductors 12 and 13 (FIG. 1A) for transmitting voice and carrier frequency signals in opposite directions (Abstract). The conductor pair is divided into two sections, and coupled together via a voice frequency loading coil 16 (FIG. 1A). The voice frequency loading coil 16 includes a first pair of windings 17 and 18 (FIG. 1A) coupled in series and a second pair of windings 23 and 24 (FIG. 1A) coupled in series for minimizing the loss of the voice frequency signal transmitted on the conductor pair (col. 2, lines 63-65). In addition, the voice frequency loading coil 16 includes a resonant network 29 (FIG. 1A) that interconnects a second end of winding 17 and a first end of winding 18 to a second end of winding 23 and a first end of winding 24 for resonating at a pre-selected carrier frequency to improve transmission of a carrier frequency signal at the pre-selected carrier frequency (Abstract). In summary, *Birck's* voice frequency loading coil 16 is configured with selected capacitances and inductances to process voice frequency signals and 10-100 kHz carrier frequency signals (col. 3, lines 4-6). In another embodiment, *Birck* discloses a loading coil circuit 38 (FIG. 1C) that is identical to the voice frequency loading coil 16, but with a frequency selective device 39 (FIG. 1C) connected in shunt of the loading coil 16 to pass signals whose frequencies exceed 100 kHz (col. 3, line 71 – col. 4, line 4).

The Examiner states, paragraph 13, lines 3-5, "Birck teaches a load coil comprising **two** windings, with a frequency selective device to allow currents above a certain frequency to bypass the loading coil." In addition the Examiner states, paragraph 13, lines 7-9, "[i]t would have been obvious to ... utilize capacitors ... for the purpose of providing the frequency selective device ...."

Applicants have amended claim 6 to better define the scope of the invention. Amended claim 6 recites,

> A load coil for insertion along a local loop, the load coil comprising: a coupled inductor having first and second windings ... the coupled inductor **configured** to condition the loop for transmission of POTS-band signals across the local loop; a first capacitive element disposed **in parallel with the first winding**; and a second capacitive element disposed **in parallel with the second winding**, the first capacitive element and the second capacitive element **configured** to permit passage of DSL signals across the load coil with low attenuation (emphasis added).

Applicants respectfully submit that *Birck* teaches a load coil with four windings: a first pair of windings 17 and 18 and a second pair of windings 23 and 24. *Birck* does not suggest or teach "a load coil comprising two windings." More specifically, *Birck* does not teach "a first capacitive element disposed **in parallel with the first winding**," and "a second capacitive element disposed **in parallel with the second winding**," as claimed. The combination suggested by the Examiner **does not** produce the present invention as claimed. For example, if the frequency selective device utilizes capacitors, the suggested combination produces a network with a first capacitor in parallel with the first pair of windings (17, 18), and a second capacitor in parallel with the second pair of windings (23, 24). In other words, the suggested combination produces a first capacitor in parallel with a series combination of a first and second winding, and a second capacitor in parallel with a series combination of a third and a fourth winding, but the suggested combination **does not** produce "a first capacitive element ... in parallel with the first winding," and "a second capacitive element ... in parallel with the second winding."

In addition, Applicants respectfully submit that *Birck's* system is not "configured to permit passage of DSL signals across the load coil with low attenuation" as claimed. *Birck* discloses that signals whose frequencies exceed 100 kHz bypass the loading coil 16, while the loading coil 16 is designed to resonate at a pre-selected carrier frequency selected from the 10-

100 kHz bandwidth, preferably at 64 kHz (col. 3, lines 4-12). DSL signals have a bandwidth of about 26-1104 kHz. Thus *Birck's* loading coil, upon reception of the 26-1104 kHz DSL signal, would only pass a 100-1104 kHz portion of the present invention's DSL signal, and would resonate a 64 kHz frequency component of the present invention's DSL signal. Consequently, *Birck's* system resonates a frequency component in the 26-100 kHz band of the DSL signal, and passes the 100-1104 Khz band of the DSL signal, but *Birck's* system is **not** designed or configured **to pass** the 26-1104 kHz DSL signal, as claimed in the present invention.

Based on at least the above remarks, Applicants respectfully submit that the combination of *Birck* and the well known prior art does not give the present invention as claimed, and request that amended claim 6 be allowed to pass.

In paragraphs 14-17, the Examiner rejected claims 7, 8, and 10 as being unpatentable over *Birck* in view of well known prior art, and claim 9 as being unpatentable over *Birck* in view of *Baker*. Since claims 7-10 depend from amended claim 6, Applicants submit that they are allowable for at least the same reasons. Furthermore, in regard to claims 7, 8, and 10, the combination of *Birck* with the alleged well known prior art does not remedy the deficiencies of the primary reference. Likewise, with regard to claim 9, the combination of *Birck* in view of *Baker* does not remedy the deficiencies of the primary reference. Therefore, Applicants respectfully request that the rejections of claims 7-10 be withdrawn.

In paragraph 18 of the Office Action, the Examiner rejected claim 11 as being unpatentable over *Birck* in view of well known prior art as applied to claim 6, and further in view of *Vittore*. The Examiner states, paragraph 18, lines 6-7, "Birck in combination with well known prior art teaches all the elements of the first load coil." Applicants respectfully traverse. Applicants respectfully submit that even if it would have been obvious to utilize the frequency

selective DSL amplifier disclosed by *Vittore* as *Birk's* frequency selective device 39 (FIG. 1C), the combination of the secondary reference with the primary reference does not remedy the deficiencies of the primary reference as discussed above with regard to amended claim 6.

In paragraphs 19-24 of the Office Action, the Examiner rejected claims 12-15 as being unpatentable over *Birck* in view of well known prior art, and further in view of at least *Vittore*. Since claims 12-15 depend directly or indirectly from claim 11, Applicants respectfully submit that they are allowable for at least the same reasons, and request that they be allowed to pass.

In paragraph 25, the Examiner rejected claim 16 as being unpatentable over *Birck* in view of well known prior art. Applicants respectfully traverse. Amended claim 16 recites,

> A load coil coupled to a local loop for improving **simultaneous** transmission of POTS and DSL signals across the local loop **in any direction**, the load coil comprising: inductive means for conditioning the POTS signals as they traverse the local loop; and capacitive means coupled to the inductive means for permitting the DSL signals to **pass** across the load coil (emphasis added).

Amended claim 16 recites an capacitive and an inductive means for improving the "**simultaneous** transmission of POTS and DSL signals across the local loop **in any direction**" (emphasis added). In contrast, *Birck* discloses a conductor pair for "simultaneously transmitting voice and carrier frequency signaling current in **opposite** directions" (emphasis added). Thus, *Birck* does not disclose a means for improving the simultaneously transmission of voice and carrier frequency signaling current (or POTS and DSL signals) in any direction along the local loop, as claimed in the present invention.

Additionally, Applicants submit that *Birck* does not disclose a "capacitive means coupled to the inductive means for permitting the DSL signals to **pass** across the load coil" as claimed (emphasis added). As previously discussed above in conjunction with amended claim 6, *Birck*

discloses signal frequencies that exceed 100 kHz bypass the loading coil 16, while the loading coil 16 is designed to resonate at a pre-selected carrier frequency selected from the 10-100 kHz band, preferably 64 kHz. DSL signals have a bandwidth of about 26-1104 kHz. Applicants submit that *Birck's* loading coil 16 would only pass the 100-1104 kHz portion of the present invention's DSL signal. *Birck's* system would not pass the remaining 26-100 kHz portion of the DSL signal, and in fact, *Birck's* resonant network 29 resonates the 64 kHz frequency component of the present invention's DSL signal. *Birck's* system processes different frequency components of the DSL signal in different manners, and consequently *Birck* does not disclose a method to pass the DSL signal as claimed in the present invention. Based on at least the above remarks, Applicants respectfully submit that amended claim 16 is not obvious over *Birck* in view of known prior art, and request that claim 16 be allowed.

In paragraph 26, the Examiner rejected claim 17 as being unpatentable over *Birck* in view of well known prior art as applied to claim 6 above, and further in view of *Vittore*. Applicants respectfully traverse. Based on at least the above remarks in conjunction with amended claim 6, Applicants respectfully submit that *Birck* in combination with the well known prior art does not teach all the elements of the load coil means, and the further combination of *Vittore* with *Birck* and the well known prior art does not remedy the deficiencies of the primary reference. Applicants respectfully request that the rejection of claim 17 be withdrawn.

New Claims

To further distinguish the present invention over *Quarles*, Applicants are adding new claims 18-22. Applicants submit that claims 18-22 introduce no new matter. Claim 18 recites

> A method for improving **simultaneous** transmission of POTS-band signals and DSL signals across a local loop, comprising the steps of: inductively coupling a first segment of the local loop to a second segment of the local loop to condition the POTS-band signals traversing the

local loop; capacitively coupling the first segment of the local loop to the second segment of the local loop to pass the DSL signals traversing the local loop.

Claim 22 is similar in scope to amended claim 1. Claim 22 recites,

> A system to improve **simultaneous** transmission of POTS-band signals and DSL signals across a local loop, the system comprising: a first local loop ... a second local loop ... a coupled inductor **configured** to condition the POTS-band signals traversing the first and second local loops ... and capacitive elements **configured** to pass the DSL signals traversing the first and second local loops ....

Claim 18 recites a method for improving **simultaneous** transmission of POTS-band signals and DSL signals across a local loop, and claim 22 recites a system to improve **simultaneous** transmission of POTS-band signals and DSL signals across a local loop. Applicants respectfully submit that *Quarles* does not disclose a method or a system for simultaneous transmission of two frequency bands signals, such as POTS-band signals and DSL signals. In fact, Quarles discloses a system that **only** processes POTS-band signals by equalizing wave velocities of POTS-band signal frequency components to affect the quality of POTS-band signal transmission in long lines. *Quarles'* system is **not** designed or configured to simultaneously process two frequency band signals. Based on at least the above remarks, Applicants submit that claim 18, claims 19-21 that depend from claim 18, and claim 22 are not anticipated by *Quarles*.

To further distinguish the present invention over *Birck*, Applicants are adding new claim 23. Applicants submit that claim 23 recites no new matter. Claim 23 recites,

> A system to improve **simultaneous** transmission of POTS-band signals and DSL signals across a local loop, the system comprising: a first local loop ... including a first wire, and a second wire ... a second local loop ... including a third wire, and a fourth wire; a coupled inductor configured to condition the POTS-band signals traversing the first and second local loops, the coupled inductor including ... a first inductor winding ... coupling the first wire to the third wire, and a second inductor winding ... coupling the second wire to the fourth wire; and capacitive elements configured to pass the DSL signals traversing the first and second local loops, the capacitive elements including a first capacitor coupling the first wire to the

third wire, and a second capacitor coupling the second wire to the fourth wire (emphasis added).

Claim 23 is similar in scope to amended claim 6 with the added limitation of "**simultaneous** transmission of POTS-band signals and DSL signals across a local loop." Applicants respectfully submit that the "simultaneous transmission of POTS-band signals and DSL signals across a local loop" covers the simultaneous transmission of POTS and DSL signals in any direction along the local loop. In contrast, *Birck* discloses a conductor pair for "simultaneously transmitting voice and carrier frequency signaling current in **opposite** directions" (emphasis added). *Birck* **does not** disclose a conductor pair (i.e., local loop) for simultaneously transmitting voice and carrier frequency signaling current in the same direction, as is inherent in the present invention as claimed. Based on at least the above remarks, Applicants submit that claim 23 is not obvious over *Birck* and the well known prior art.

Conclusion

Based on the foregoing remarks, Applicants believe that the rejections and objections in the Office Action of April 3, 2002 are fully overcome and that the application is in condition for allowance. If the Examiner has any questions regarding the case, the Examiner is invited to contact Applicants' undersigned representative at the number given below.

Respectfully submitted,

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APPENDIX

In the specification:

Paragraph beginning on page 15, line 3:

The load coil 130 of FIG. 4 has considerable utility in that, like the load coil 130 of FIG. [4] 3, the FIG. 4 load coil conditions the local loop for POTS service while permitting digital services to be provided over the same loop. However, in one application, use of the FIG. 4 embodiment may [have] cause some degradation of POTS service. The load coil of FIG. 3, therefore, may be preferable to the load coil of FIG. 4 in some applications.

In the claims:

1. (Once Amended) A load coil for insertion along a local loop [to counteract a parallel capacitance of the local loop to improve transmission of POTS-band signals and permit passage of DSL signals], the load coil comprising:

a coupled inductor having first and second windings wrapped about an inductor core, each winding having an input and an output, the coupled inductor configured to counteract a parallel capacitance of the local loop to improve transmission of POTS-band signals across [for disposal along] the local loop;

a first capacitive element disposed between the input of the first winding and the input of the second winding; and

a second capacitive element disposed between the output of the first winding and the output of the second winding, the first capacitive element and the second capacitive element configured to permit passage of DSL signals across the load coil.

5. (Once Amended) The load coil of claim 1, wherein the first and second windings have an inter-winding capacitance and the first and second [capacitances] capacitive elements increase the effective inter-winding capacitance of the first and second windings by at least a factor of 5.

6. (Once Amended) A load coil for insertion along a local loop [to condition the loop for the transmission of POTS signals and permit passage of DSL signals with low attenuation], the load coil comprising:

a coupled inductor having first and second windings wrapped about an inductor core, each winding having an input and an output, the coupled inductor configured to improve transmission of POTS-band signals [for disposal along] across the local loop;

a first capacitive element disposed in parallel with the first winding; and

a second capacitive element disposed in parallel with the second winding, the first capacitive element and the second capacitive element configured to permit passage of DSL signals across the load coil with low attenuation.

10. (Once Amended) The load coil of claim 6, wherein the first and second windings each have an intra-winding capacitance and the first and second [capacitances] capacitive elements increase the effective intra-winding capacitance of the first and second windings by at least a factor of 120.

16. (Once Amended) A load coil [for disposal along] coupled to a local loop [to condition POTS signals and to permit passage of DSL signals as the] for improving simultaneous transmission of POTS and DSL signals [traverse] across the local loop in any direction, the load coil comprising:

inductive means for conditioning the POTS signals as they traverse the local loop; and

capacitive means coupled to the inductive means for permitting the DSL signals to pass across the load coil.